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Effect of fence-line or drylot weaning on the health and performance of beef calves during weaning, receiving, and finishing[1]

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ABSTRACT

Angus × Hereford beef heifers and steers (n = 460; initial BW = 225 ± 35 kg) were randomly allocated to 1 of 3 ranch-of-origin weaning methods 28 d in duration: drylot weaning + dam separation (D), pasture weaning + fence-line contact with dams (PF), and pasture weaning + fence-line contact with dams + supplemental feed delivered in a bunk (PF+S). Calves assigned to D were fed a diet formulated to promote an ADG of 1 kg at a DMI of 2.5% of BW (17.7% CP and 0.93 Mcal of NE_g/kg). The PF calves had access to native forage, and PF+S calves had access to native forage and received the diet fed to D at a rate of 1% of BW 3× weekly. After the 28-d weaning period, calves were transported 4 h to a feedlot, penned according to treatment (n = 6 pens per treatment), and fed a receiving diet (14.9% CP and 0.93 Mcal of NE_g/kg) ad libitum for 60 d before transition to a finishing diet. During the first 6 d of receiving, the proportion of calves in each pen that approached the bunk and ate immediately following feed delivery at 0700 h was recorded by 2 trained observers. Weaning-phase ADG was greater ($P < 0.01$) for D than for PF or PF+S; however, morbidity during weaning tended to be greater ($P = 0.08$) in D than in PF or PF+S. Receiving ADG of D was greater ($P = 0.01$) than of PF and PF+S. Fewer PF calves were observed at the bunk during the first 5 d of receiving (treatment × day; $P < 0.01$) than D or PF+S calves; however, the proportion of calves observed at the bunk was not different (treatment × day; $P = 0.64$) among treatments on d 6. Consequently, receiving DMI and G:F were greater ($P \leq 0.01$) for D than for PF calves. Steers assigned to D were heavier ($P < 0.01$) than steers assigned to PF or PF+S at the beginning of the finishing period; however, steers assigned to PF had greater finishing ADG ($P < 0.01$) than those assigned to D or PF+S. There were no treatment differences ($P \leq 0.14$) in days on feed or finishing period DMI; therefore, finishing G:F was greater ($P < 0.01$) for PF than D or PF+S. Carcass characteristics were not different ($P \geq 0.36$) among treatments. Under the conditions of the current experiment, acclimating pasture-weaned calves to feed bunks during preconditioning had no effects on feedlot health and performance.

Key words: beef calf, pasture weaning, preconditioning, weaning

INTRODUCTION

Retaining calves on the ranch of origin for a period of time after weaning has been recommended as a means of improving the welfare and performance of beef calves by diminishing the stresses associated with weaning, transport, diet change, and commingling (Cole, 1985). Calf management strategies involving pasture weaning coupled with maternal contact (i.e., fence-line weaning) have been recommended as possible best-management

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practices for minimizing stress (Smith et al., 2003). Fence-line weaning reduced subsequent feedlot morbidity compared with drylot weaning (Boyles et al., 2007; Mathis et al., 2008). Additionally, Price et al. (2003) found that maintaining fence-line contact with dams after weaning reduced symptoms of behavioral distress (e.g., vocalizing and pacing) when compared with complete separation from dams. Little information is published on possible carryover effects of fence-line weaning compared with conventional drylot weaning on performance and behavior during feedlot receiving.

Calf BW gains during weaning are variable and can be affected by weaning method (Mathis et al., 2008), in addition to other factors. Decreased BW gain during weaning may carry over into the finishing phase and influence performance and carcass characteristics. Price et al. (2003) reported modest BW gains during weaning resulted in reduced calf BW for the first 10 wk of finishing relative to calves fed more aggressively. In contrast, Mathis et al. (2008) found calves weaned on native range weighed less at the end of the weaning phase and gained more BW during the first 75 d of finishing than calves weaned in a drylot. Mathis et al. (2009) compared low- and high-input pasture weaning methods where calves had access to a self-fed diet (i.e., high-input pasture weaning) or were hand fed range cubes (i.e., low-input pasture weaning) 3× weekly and found no differences in finishing performance or profitability of the calves from weaning through slaughter. Beef producers who retain ownership of calves through finishing may be able to employ a low-input weaning program to minimize costs, while expecting similar finishing end points relative to a high-input weaning program. Therefore, the objectives of this experiment were to measure growth, health, and carcass characteristics among beef calves subjected to a drylot weaning + complete dam separation, pasture weaning + fence-line contact with dams, or pasture weaning + fence-line contact with dams + supplemental feed delivered in a bunk.

MATERIALS AND METHODS

Experimental Animals

Animal care practices used in the experiment were approved by the Kansas State University Animal Care and Use Committee (protocol no. 2978.1).

Angus × Hereford calves (n = 460; 226 heifers and 234 steers; initial BW = 225 ± 35 kg) originating from the Kansas State University Commercial Cow-Calf Unit and the Western Kansas Agricultural Research Center–Hays were used in this experiment. Calves were spring-born (average birth date = April 6 ± 19 d) to dams with an average age of 6 ± 3.2 yr. Steer calves were castrated before 60 d of age, and if necessary, calves were dehorned at the time of castration. Dehorning was administered to <25% of calves. All calves were vaccinated against clostridial diseases (Ultrabac 7; Pfizer Animal Health, Exton, PA) at approximately 60 d of age.

Treatments

At weaning, calves (average weaning age = 180 ± 17 d) were assigned randomly within source to 1 of 3 ranch-of-origin weaning methods: drylot weaning + complete visual and auditory separation from dams (**D**; n = 155), pasture weaning + fence-line contact with dams (**PF**; n = 152), and pasture weaning + fence-line contact with dams + supplemental feed delivered in a bunk (**PF+S**; n = 153). All calves were individually weighed at the time of maternal separation and were given initial vaccinations against respiratory pathogens (Bovi-Shield Gold 5, Pfizer Animal Health), clostridial pathogens (Ultrabac 7, Pfizer Animal Health), and *Haemophilus somnus* (Somubac, Pfizer Animal Health). In addition, all calves were treated for internal and external parasites (Ivomec, Merial Limited, Atlanta, GA). Booster vaccinations were administered 14 d later.

Within source, calves assigned to PF and PF+S were maintained for 28 d in a single native-forage pasture (minimum area = 48 ha). Dams of calves assigned to PF and PF+S were maintained for the first 7 d of this period in adjacent native pastures that afforded fence-line contact with calves (minimum frontage = 200 m; 4-strand, barbed-wire fence with the bottom 2 wires electrified). Fresh water, salt, and mineral supplements were available continually. Calves assigned to D were transported a short distance (<48 km) immediately after separation from dams and confined within location to a single earth-surfaced pen (minimum area = 18.6 m^2 per calf; bunk space = 0.46 m per calf).

Calves assigned to D were fed a diet formulated to promote 1 kg of ADG at a DMI of 2.5% of BW during the weaning phase of the experiment (Table 1). Calves assigned to PF had access to native forage only (Table 2), whereas calves assigned to PF+S had access to native forage and received the diet fed to D 3× weekly in amounts equal to 1% of BW at each feeding. A feeding management program described previously (Olson et al., 2007) was used to adapt calves to the preconditioning diet. The amount of feed offered each d (0700 h) was adjusted using the bunk-scoring system described by Clark et al. (2006). Feed bunks were cleaned at approximately 0500 h. Residual feed was weighed and recorded. Feed (DM basis) delivered to the bunk each day was weighed, with DMI subsequently calculated as the difference between the amount of feed delivered and residual feed remaining in the bunk 22 h later. If all feed delivered to a pen was consumed by 0500 h, delivery at the next feeding was increased to 102% of the previous delivery. Diet samples were collected from bunks weekly and frozen (−20°C). Samples were composited at the conclusion of the experiment and submitted to a commercial laboratory (SDK Laboratories, Hutchinson, KS) for analysis of DM (Goering and Van Soest, 1970), N (AOAC International, 2000;